footnote (then Footnote No. 287) was added at WARC-59 to protect primarily railroad radio operations on those frequencies in the U.S. and Canada.[14] More recently, at the 2000 World Radiocommunications Conference (WRC-2000) in Istanbul, a proposed change to Appendix S18 regarding the simplex use of certain maritime channels could have affected U.S. and Canadian railroads' use of the channels. Both the U.S. and Canadian delegations offered compromise proposals (which ultimately were adopted at WRC-2000) to protect U.S. and Canadian railroad communications on those channels. In this regard, the Final Report of the U.S. Delegation stated as follows:

> The U.S. objective going into the Conference with respect to the Maritime VHF Channel Plan in Appendix S18 was twofold: (1) make minimal changes to Appendix S18 to allow interim flexibility to administrations in meeting increasing requirements for maritime VHF communications by permitting simplex use of certain duplex channels while avoiding any "pre-selection" of any particular digital technology for future use of these channels; and (2) *ensure that any changes to Appendix S18 do not result in interference on the channels used in the U.S. for railroad mobile communications networks.*
>
> Both objectives were achieved. . . .
>
> *As to the second objective, the railroads' continued use of certain Appendix S18 channels in the U.S. (and Canada) is protected because the provision that allows maritime use in simplex mode does not take effect automatically. Simplex use of the duplex channels is permitted only on the condition that special bilateral or multilateral international agreements permit such use. In this regard, both the U.S. and Canada made it clear at the Conference that they will not permit maritime simplex use on the portion of the Appendix S18 duplex channels allocated for railroad use in the U.S. and Canada.*

---

14 "VHF Communications Usage by U.S. Railroads," U.S. Department of Commerce, Institute for Telecommunications Services, Final Report, 1977.

* * *

> Final Report of WRC-2000 U.S. Delegation, July 8, 2000, emphasis added.

Another significant international feature of the railroads' spectrum usage is that railroad mobile radio operations cross international boundaries every day. Many trains that originate in the United States terminate in Canada or Mexico and vice versa. Indeed, in accordance with longstanding bilateral frequency agreements, Canadian and U.S. railroads operate on the same mobile radio frequencies in the VHF band to accommodate the significant cross-border train traffic between the two countries.

In light of the history and experience of the North American railroad industry in the international aspects of spectrum allocation affecting the railroads' VHF spectrum usage, AAR recommends that the Task Force be mindful that U.S. spectrum policies do not exist in a vacuum, and that any changes in domestic spectrum policy take into account all relevant global and international considerations, particularly the allocation agreements reached by the International Telecommunications Union.

V. CONCLUSION

The railroad industry is experiencing heavy congestion in the mobile radio frequency bands over which AAR exercises coordination control,[15] particularly in the major urban centers where rail lines converge and large terminal and yard operations are located. AAR recently performed an industry self-assessment concerning future

---

[15] Those three bands are the VHF frequencies at 160.215-161.565 MHz, the designated channel pairs between 450-460 MHz, and the six channel pairs at 896/923 MHz for ATCS/PTC.

operational needs and found that, even with the implementation of the channel plan for the VHF band, the demand for channel capacity by the railroads will exceed the supply in the major urban areas.

Just as the U.S. economy is critically dependent on the railroad industry for the safe and timely transport of passengers, raw materials and finished goods, so likewise is the rail industry critically dependent on spectrum. Without access to adequate spectrum capacity, the railroads simply would not be able to operate in the manner they do today. New communications applications such as broadband data networking, digital encryption, geolocation and geopositioning, and many more, will certainly result in an increased dependency on spectrum resources in the future. In short, access to adequate spectrum will be essential for the continued growth and operation of the nation's railroad infrastructure. Any changes toward a more market-oriented spectrum allocation policy must not jeopardize the continued availability of spectrum for operational support of critical infrastructure functions such as rail transportation.

Respectfully submitted,

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Date: July 8, 2002

<u>EXHIBITS</u>:

A – Map of Railroads' Nationwide VHF Base Station Locations

B – New AAR Channel Plan Based on FCC's "Refarming" Decision

C – Diagram of AAR's New VHF Trunked Digital Radio System

D – AAR Petition for Nationwide Geographic "Ribbon" License for ATCS/PTC

E – FCC Order (DA 01-359) Granting AAR Petition for Nationwide "Ribbon" License

Exhibit A to Comments of
Association of American Railroads
ET Docket No. 02-135
July 8, 2002

RAILROAD BASE STATION LOCATIONS

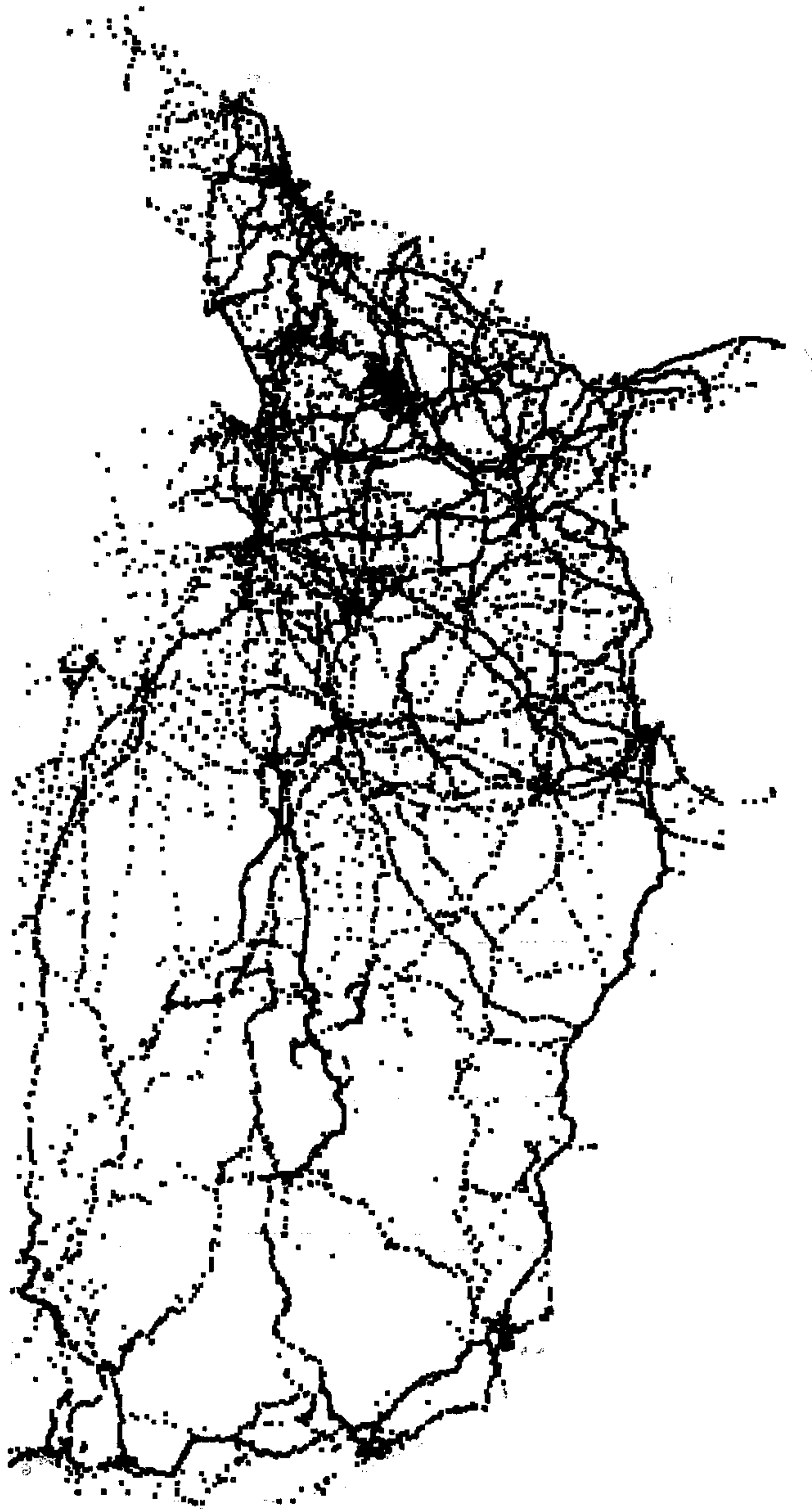

Exhibit B to Comments of
Association of American Railroads
ET Docket No. 02-135
July 8, 2002

Railroad Industry 160MHz Channel Plan

OLD CHAN #	25 kHz FREQ. (15 kHz spacing)	NEW CHAN #	12.5 kHz FREQ. (7.5 kHz spacing)		Duplex Offset (720 kHz)	New Block
7	160.215	007	160.2150	<Rx---Tx>	160.9350	A
		107	160.2225	<Rx---Tx>	160.9425	B
8	160.230	008	160.2300	<Rx---Tx>	160.9500	C
		108	160.2375	<Rx---Tx>	160.9575	D
9	160.245	009	160.2450	<Rx---Tx>	160.9650	E
		109	160.2525	<Rx---Tx>	160.9725	F
10	160.260	010	160.2600	<Rx---Tx>	160.9800	G
		110	160.2675	<Rx---Tx>	160.9875	H
11	160.275	011	160.2750	<Rx---Tx>	160.9950	I
		111	160.2825	<Rx---Tx>	161.0025	J
12	160.290	012	160.2900	<Rx---Tx>	161.0100	A
		112	160.2975	<Rx---Tx>	161.0175	B
13	160.305	013	160.3050	<Rx---Tx>	161.0250	C
		113	160.3125	<Rx---Tx>	161.0325	D
14	160.320	014	160.3200	<Rx---Tx>	161.0400	E
		114	160.3275	<Rx---Tx>	161.0475	F
15	160.335	015	160.3350	<Rx---Tx>	161.0550	G
		115	160.3425	<Rx---Tx>	161.0625	H
16	160.350	016	160.3500	<Rx---Tx>	161.0700	I
		116	160.3575	<Rx---Tx>	161.0775	J
17	160.365	017	160.3650	<Rx---Tx>	161.0850	A
		117	160.3725	<Rx---Tx>	161.0925	B
18	160.380	018	160.3800	<Rx---Tx>	161.1000	C
		118	160.3875	<Rx---Tx>	161.1075	D
19	160.395	019	160.3950	<Rx---Tx>	161.1150	E
		119	160.4025	<Rx---Tx>	161.1225	F
20	160.410	020	160.4100	<Rx---Tx>	161.1300	G
		120	160.4175	<Rx---Tx>	161.1375	H
21	160.425	021	160.4250	<Rx---Tx>	161.1450	I
		121	160.4325	<Rx---Tx>	161.1525	J
22	160.440	022	160.4400	<Rx---Tx>	161.1600	A
		122	160.4475	<Rx---Tx>	161.1675	B
23	160.455	023	160.4550	<Rx---Tx>	161.1750	C
		123	160.4625	<Rx---Tx>	161.1825	D
24	160.470	024	160.4700	<Rx---Tx>	161.1900	E
		124	160.4775	<Rx---Tx>	161.1975	F
25	160.485	025	160.4850	<Rx---Tx>	161.2050	G
		125	160.4925	<Rx---Tx>	161.2125	H
26	160.500	026	160.5000	<Rx---Tx>	161.2200	I
		126	160.5075	<Rx---Tx>	161.2275	J
27	160.515	027	160.5150	<Rx---Tx>	161.2350	A
		127	160.5225	<Rx---Tx>	161.2425	B
28	160.530	028	160.5300	<Rx---Tx>	161.2500	C

		128	160.5375	<Rx---Tx>	161.2575	D
29	160.545	029	160.5450	<Rx---Tx>	161.2650	E
		129	160.5525	<Rx---Tx>	161.2725	F
30	160.560	030	160.5600	<Rx---Tx>	161.2800	G
		130	160.5675	<Rx---Tx>	161.2875	H
31	160.575	031	160.5750	<Rx---Tx>	161.2950	I
		131	160.5825	<Rx---Tx>	161.3025	J
32	160.590	032	160.5900	<Rx---Tx>	161.3100	A
		132	160.5975	<Rx---Tx>	161.3175	B
33	160.605	033	160.6050	<Rx---Tx>	161.3250	C
		133	160.6125	<Rx---Tx>	161.3325	D
34	160.620	034	160.6200	<Rx---Tx>	161.3400	E
		134	160.6275	<Rx---Tx>	161.3475	F
35	160.635	035	160.6350	<Rx---Tx>	161.3550	G
		135	160.6425	<Rx---Tx>	161.3625	H
36	160.650	036	160.6500	<Rx---Tx>	161.3700	I
		136	160.6575	<Rx---Tx>	161.3775	J
37	160.665	037	160.6650	<Rx---Tx>	161.3850	A
		137	160.6725	<Rx---Tx>	161.3925	B
38	160.680	038	160.6800	<Rx---Tx>	161.4000	C
		138	160.6875	<Rx---Tx>	161.4075	D
39	160.695	039	160.6950	<Rx---Tx>	161.4150	E
		139	160.7025	<Rx---Tx>	161.4225	F
40	160.710	040	160.7100	<Rx---Tx>	161.4300	G
		140	160.7175	<Rx---Tx>	161.4375	H
41	160.725	041	160.7250	<Rx---Tx>	161.4450	I
		141	160.7325	<Rx---Tx>	161.4525	J
42	160.740	042	160.7400	<Rx---Tx>	161.4600	A
		142	160.7475	<Rx---Tx>	161.4675	B
43	160.755	043	160.7550	<Rx---Tx>	161.4750	C
		143	160.7625	<Rx---Tx>	161.4825	D
44	160.770	044	160.7700	<Rx---Tx>	161.4900	E
		144	160.7775	<Rx---Tx>	161.4975	F
45	160.785	045	160.7850	<Rx---Tx>	161.5050	G
		145	160.7925	<Rx---Tx>	161.5125	H
46	160.800	046	160.8000	<Rx---Tx>	161.5200	I
		146	160.8075	<Rx---Tx>	161.5275	J
47	160.815	047	160.8150	<Rx---Tx>	161.5350	DUPLX
		147	160.8225	<Rx---Tx>	161.5425	DUPLX
48	160.830	048	160.8300	<Rx---Tx>	161.5500	DUPLX
		148	160.8375	<Rx---Tx>	161.5575	DUPLX
49	160.845	049	160.8450	<Rx---Tx>	161.5650	DUPLX
		149	160.8525			**SMPLX**
50	160.860	050	160.8600			DATA
		150	160.8675			DATA
51	160.875	051	160.8750			DATA
		151	160.8825			DATA
52	160.890	052	160.8900			DATA
		152	160.8975			DATA
53	160.905	053	160.9050			DATA

		153	160.9125			DATA
54	160.920	054	160.9200			DATA
		154	160.9275			**SMPLX**
55	160.935	055	160.9350	<Tx---Rx>	160.2150	A'
		155	160.9425	<Tx---Rx>	160.2225	B'
56	160.950	056	160.9500	<Tx---Rx>	160.2300	C'
		156	160.9575	<Tx---Rx>	160.2375	D'
57	160.965	057	160.9650	<Tx---Rx>	160.2450	E'
		157	160.9725	<Tx---Rx>	160.2525	F'
58	160.980	058	160.9800	<Tx---Rx>	160.2600	G'
		158	160.9875	<Tx---Rx>	160.2675	H'
59	160.995	059	160.9950	<Tx---Rx>	160.2750	I'
		159	161.0025	<Tx---Rx>	160.2825	J'
60	161.010	060	161.0100	<Tx---Rx>	160.2900	A'
		160	161.0175	<Tx---Rx>	160.2975	B'
61	161.025	061	161.0250	<Tx---Rx>	160.3050	C'
		161	161.0325	<Tx---Rx>	160.3125	D'
62	161.040	062	161.0400	<Tx---Rx>	160.3200	E'
		162	161.0475	<Tx---Rx>	160.3275	F'
63	161.055	063	161.0550	<Tx---Rx>	160.3350	G'
		163	161.0625	<Tx---Rx>	160.3425	H'
64	161.070	064	161.0700	<Tx---Rx>	160.3500	I'
		164	161.0775	<Tx---Rx>	160.3575	J'
65	161.085	065	161.0850	<Tx---Rx>	160.3650	A'
		165	161.0925	<Tx---Rx>	160.3725	B'
66	161.100	066	161.1000	<Tx---Rx>	160.3800	C'
		166	161.1075	<Tx---Rx>	160.3875	D'
67	161.115	067	161.1150	<Tx---Rx>	160.3950	E'
		167	161.1225	<Tx---Rx>	160.4025	F'
68	161.130	068	161.1300	<Tx---Rx>	160.4100	G'
		168	161.1375	<Tx---Rx>	160.4175	H'
69	161.145	069	161.1450	<Tx---Rx>	160.4250	I'
		169	161.1525	<Tx---Rx>	160.4325	J'
70	161.160	070	161.1600	<Tx---Rx>	160.4400	A'
		170	161.1675	<Tx---Rx>	160.4475	B'
71	161.175	071	161.1750	<Tx---Rx>	160.4550	C'
		171	161.1825	<Tx---Rx>	160.4625	D'
72	161.190	072	161.1900	<Tx---Rx>	160.4700	E'
		172	161.1975	<Tx---Rx>	160.4775	F'
73	161.205	073	161.2050	<Tx---Rx>	160.4850	G'
		173	161.2125	<Tx---Rx>	160.4925	H'
74	161.220	074	161.2200	<Tx---Rx>	160.5000	I'
		174	161.2275	<Tx---Rx>	160.5075	J'
75	161.235	075	161.2350	<Tx---Rx>	160.5150	A'
		175	161.2425	<Tx---Rx>	160.5225	B'
76	161.250	076	161.2500	<Tx---Rx>	160.5300	C'
		176	161.2575	<Tx---Rx>	160.5375	D'
77	161.265	077	161.2650	<Tx---Rx>	160.5450	E'
		177	161.2725	<Tx---Rx>	160.5525	F'
78	161.280	078	161.2800	<Tx---Rx>	160.5600	G'

		178	161.2875	<Tx---Rx>	160.5675	H'
79	161.295	079	161.2950	<Tx---Rx>	160.5750	I'
		179	161.3025	<Tx---Rx>	160.5825	J'
80	161.310	080	161.3100	<Tx---Rx>	160.5900	A'
		180	161.3175	<Tx---Rx>	160.5975	B'
81	161.325	081	161.3250	<Tx---Rx>	160.6050	C'
		181	161.3325	<Tx---Rx>	160.6125	D'
82	161.340	082	161.3400	<Tx---Rx>	160.6200	E'
		182	161.3475	<Tx---Rx>	160.6275	F'
83	161.355	083	161.3550	<Tx---Rx>	160.6350	G'
		183	161.3625	<Tx---Rx>	160.6425	H'
84	161.370	084	161.3700	<Tx---Rx>	160.6500	I'
		184	161.3775	<Tx---Rx>	160.6575	J'
85	161.385	085	161.3850	<Tx---Rx>	160.6650	A'
		185	161.3925	<Tx---Rx>	160.6725	B'
86	161.400	086	161.4000	<Tx---Rx>	160.6800	C'
		186	161.4075	<Tx---Rx>	160.6875	D'
87	161.415	087	161.4150	<Tx---Rx>	160.6950	E'
		187	161.4225	<Tx---Rx>	160.7025	F'
88	161.430	088	161.4300	<Tx---Rx>	160.7100	G'
		188	161.4375	<Tx---Rx>	160.7175	H'
89	161.445	089	161.4450	<Tx---Rx>	160.7250	I'
		189	161.4525	<Tx---Rx>	160.7325	J'
90	161.460	090	161.4600	<Tx---Rx>	160.7400	A'
		190	161.4675	<Tx---Rx>	160.7475	B'
91	161.475	091	161.4750	<Tx---Rx>	160.7550	C'
		191	161.4825	<Tx---Rx>	160.7625	D'
92	161.490	092	161.4900	<Tx---Rx>	160.7700	E'
		192	161.4975	<Tx---Rx>	160.7775	F'
93	161.505	093	161.5050	<Tx---Rx>	160.7850	G'
		193	161.5125	<Tx---Rx>	160.7925	H'
94	161.520	094	161.5200	<Tx---Rx>	160.8000	I'
		194	161.5275	<Tx---Rx>	160.8075	J'
95	161.535	095	161.5350	<Tx---Rx>	160.8150	DUPLX
		195	161.5425	<Tx---Rx>	160.8225	DUPLX
96	161.550	096	161.5500	<Tx---Rx>	160.8300	DUPLX
		196	161.5575	<Tx---Rx>	160.8375	DUPLX
97	161.565	097	161.5650	<Tx---Rx>	160.8450	DUPLX

Railroad VHF Channel Plan for New Trunked Digital Radio Systems

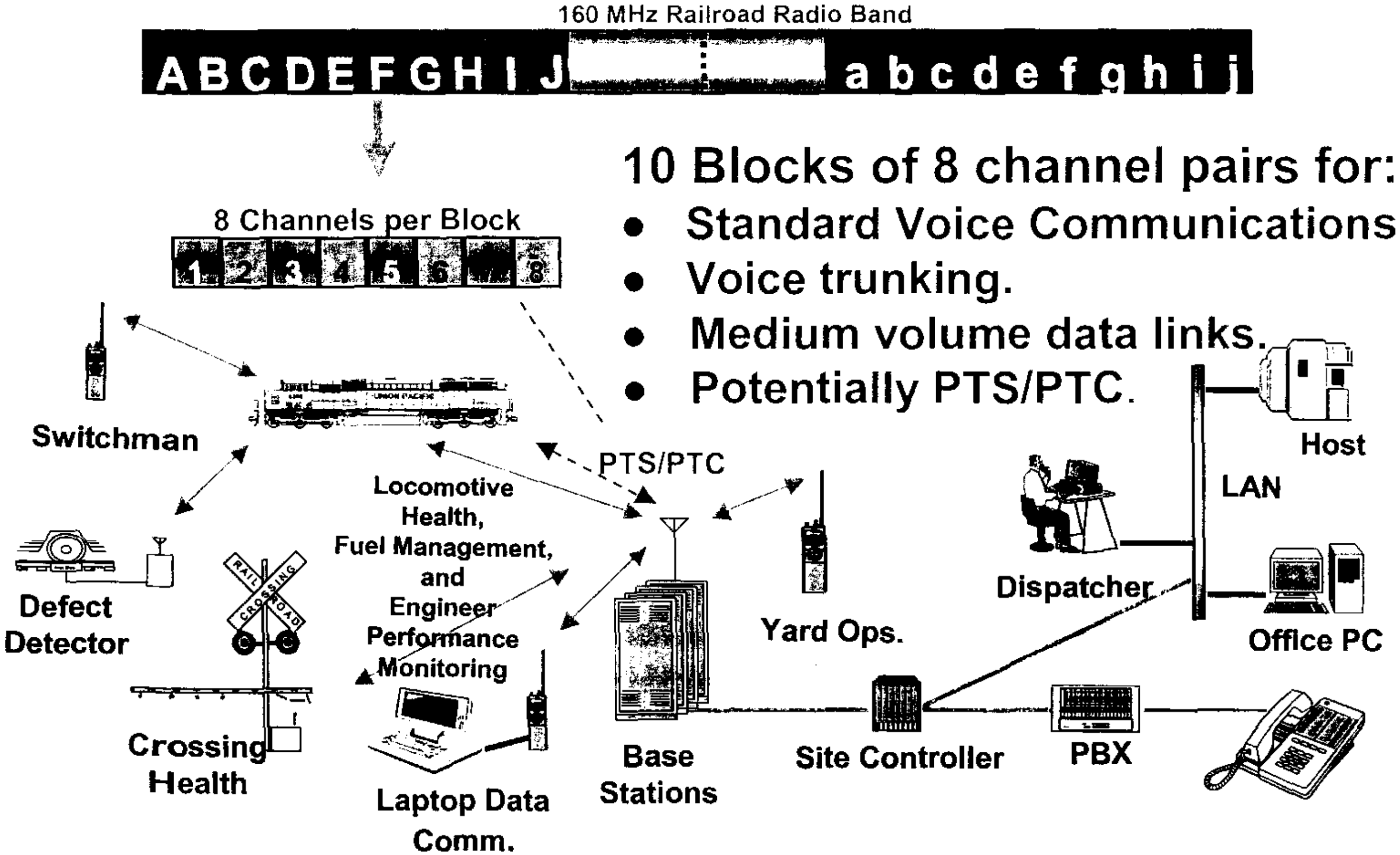

Exhibit C to Comments of
Association of American Railroads
ET Docket No. 02-135
July 8, 2002

Exhibit D to Comments of
Association of American Railroads
ET Docket No. 02-135
July 8, 2002

BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C.

In the Matter of	)	
	)	
Petition of Association of	)	
American Railroads (AAR) for	)	File No. ______________
Modification of Licenses For	)	
Use In Advanced Train	)	
Control Systems and Positive	)	
Train Control Systems	)	

PETITION FOR
MODIFICATION OF LICENSES

ASSOCIATION OF AMERICAN RAILROADS

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Its Attorneys

Date: March 24, 2000

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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Petition of Association of	)	
American Railroads (AAR) for	)	File No. ______________
Modification of Licenses For	)	
Use In Advanced Train	)	
Control Systems and Positive	)	
Train Control Systems	)	

PETITION FOR MODIFICATION OF LICENSES

The Association of American Railroads ("AAR"), licensee of 1,069 land mobile base stations whose call signs are listed in Appendix A,[1] hereby petitions the Commission for a policy determination in favor of modifying the licenses for those 1,069 stations into a single geographic license whose total area would be defined as a 70 mile zone on either side of the rights-of-way of all operating rail lines in the United States, as described more fully below.[2]

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[1] Attached as Appendix A is a listing of the 369 call signs licensed to AAR on these frequencies. Most of these licenses are for multiple base stations (total of 1,069 base stations). Attached as Appendix B is a map of the continental United States showing the location of currently licensed and pending railroad base stations using the six channel pairs at 900 MHz.

[2] AAR is preparing an application on FCC Form 600 requesting modification of these licenses, and will file such applications in the near future together with the requisite filing fees.

As part of this petition, AAR sets out the background, history and current status of deployment of the Advanced Train Control System (ATCS) licenses that were authorized by the Commission by Order in *Use of Six 900 MHz Frequency Pairs for an Advanced Train Control System,* 3 FCC Rcd 427 (1988). In support of this petition, the following is shown:

I. INTRODUCTION AND SUMMARY

A. Background and History of ATCS Frequency Allocation

In 1986, after five years of planning, testing and cooperation between U.S. and Canadian railroads, the AAR and its Canadian counterpart, the Railway Association of Canada ("RAC"), developed a preliminary plan for an innovative railroad communication system using radio and computer technology, called an Advanced Train Control System ("ATCS"). The system contemplated a U.S./Canadian network of base stations and associated mobile units in locomotives, to be used primarily for digital data transfer, using six channel pairs in the 900 MHz band. In 1987, AAR and RAC applied to the FCC and the Canadian Department of Communications, respectively, for licenses to use six conventional 900 MHz frequency pairs to operate in connection with the proposed ATCS system.[3]

In response to AAR's request, the Commission waived provisions of the rules regarding system loading and construction deadlines, and granted AAR's applications and waiver request. The Canadian Department of Communications

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3 The six frequency pairs requested by AAR and RAC were (1) 896.8875/935.8875 MHz; (2) 896.9375/935.9375 MHz; (3) 896.9875/935.9875 MHz; (4) 897.8875/936.8875 MHz; (5) 897.9375/936.9375 MHz; and

approved RAC's proposal to operate a similar ATCS system in Canada using the same frequencies. Between 1988 and the present, AAR and RAC, with their member railroads in the U.S. and Canada, have been involved in extensive testing, development, refinement and deployment of the ATCS system concept.

Changes and evolution in technology over the years have been accompanied by changes in nomenclature, such that what was called "ATCS" several years ago is now referred to as Positive Train Control, or "PTC." Positive Train Control (PTC) uses data communications and computer processing to assist railroad personnel in controlling train movement, train separation, and route alignment. Current industry activities are focused around working closely with the Federal Railroad Administration ("FRA") and state transportation safety authorities to determine the feasibility of implementing PTC to meet the safety objectives of:

- Preventing train-to-train collisions ("Positive Train Separation").
- Enforcing speed restrictions, including civil engineering restrictions and temporary slow orders.
- Providing protection for roadway workers and their equipment operating under specific authorities.

B. Summary of Petition

Because of the evolving nature of ATCS/PTC (as described in greater detail below), there is a need for flexibility in the deployment and siting of future PTC base stations throughout the rail network, both in the United States and

(6) 897.9875/936.9875 MHz.

Canada. The Canadian Government, through Industry Canada,[4] recently streamlined its approach to licensing the six channel pairs used for ATCS/PTC in Canada by issuing a single nationwide, geographic-area license to RAC in place of the many site-specific licenses which previously had been issued for these channels. AAR believes it would be in the public interest for the Commission to follow the Canadian example and issue a similar geographic-area license to AAR for stations operating on these six channel pairs. The staff of the Commission's Wireless Telecommunications Bureau is familiar with the recently-adopted Canadian regulatory approach to licensing these (and other) frequencies for railroad use in Canada.[5]

The geographic area for the single license would appear on a map as a "ribbon," the length of which would be equal to, and co-terminus with, all railroad rights-of-way located within the United States; the width of the ribbon would be 140 miles, i.e., 70 miles on either side of the right-of-way. Upon issuance of such a license by the Commission, AAR would then be in a position to issue "sub-licenses" to the individual railroads using the system, and would maintain a computerized database of all site-specific information pertaining to such sub-licenses, in the same manner as RAC is doing in Canada. The Commission and

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4 Industry Canada is the successor to the Canadian Department of Communications.

5 See letter dated June 17, 1999 from AAR's attorney to Thomas Sugrue, Chief, Wireless Telecommunications Bureau, forwarding a copy of the Industry Canada "Notice" describing the process for issuance of a single spectrum license to the Railway Association of Canada (Notice No. DGRB-002-99, published February 16, 1999). The document is available

all authorized frequency coordinators would have access to the AAR database of 900 MHz "sub-licenses" via the Internet, by means of a Web-browser interface.

II. DESCRIPTION OF EVOLUTIONARY NATURE OF ATCS/PTC TECHNOLOGY OVER THE PAST DECADE

A. The evolution in design of ATCS was linked to changes in locomotive electronics.

The Advanced Train Control Systems (ATCS) specifications were originally developed by the railroad industry with participation by equipment suppliers, with the intent of providing both interoperability across railroad control systems and interchangeability between supplier products for such systems. ATCS provided a basis for a wide range of communications-based railroad applications, including locomotive health monitoring, code line replacement, work order reporting, and PTC.

The ATCS program was primarily directed toward freight railroad requirements, although the use of the specifications for passenger trains was not precluded. To establish the standardization necessary to achieve these goals, it was recognized that:

- Standards would be required that would allow suppliers to take advantage of new technology as it became available, while maintaining interoperability across generations of equipment;
- It would be necessary to develop a new organizational approach within the industry that would involve personnel from a wide variety of technical and operating disciplines that were affected by train control system design; and

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at Industry Canada's Website at hhtp://strategis.ic.gc.ca/spectrum.

- It would be necessary to create an environment where railroads and suppliers could work together in an open forum to develop the system standards or specifications.

Major technological advances, including the availability of the Global Positioning System (GPS) for commercial use (particularly differential GPS), have changed dramatically the conceptual underpinnings of ATCS design. As a result, the North American railroads, in collaboration with safety regulatory agencies such as the Federal Railroad Administration (FRA), are continuing to further refine the ATCS system design.

The initial objective of the ATCS design was to develop a train control system at less cost than conventional train control systems that provided equivalent or greater safety of train operations, as well as business benefits. After the ATCS design concept had become fairly mature and the initial ATCS specifications had been developed, a similar need was identified for locomotive electronics. The principal heavy rail locomotive suppliers had begun to develop electronics "packages" for new locomotives, consisting of electronic displays, central locomotive computers, data buses, and fully integrated electronics to facilitate sharing of common sensor outputs and locomotive control and supervisory data. Because of run-through operations (where crews from different railroads operate other railroads' locomotives), and because of the mixing of locomotives from different suppliers on the same railroad, it was necessary to have commonality of displays in the locomotive as well as the ability to interchange subsystems between locomotives from different suppliers. To satisfy these interoperability and interchangeability requirements, the railroads established the Locomotive Systems Integration ("LSI") program, applying many of the same principles as had been applied in the ATCS program in terms of organization, type of specification, and document configuration management. As the LSI specifications were developed over the years, necessary changes were made to the ATCS locomotive system specifications to reflect the revised system configurations for new locomotives.

B. New communications capability, coupled with dramatic changes in computer power, speed, and unit costs, have revolutionized strategies for deploying automated electronics and computerized systems in railroad operations.

Railroads have invested hundreds of millions of dollars in development of new computerized applications for managing railroad operations. These investments include systems to aid in dispatching of trains; automatic equipment identification ("AEI"); geographic information systems ("GIS"); engineering and maintenance-of-way ("MOW") databases and management applications; crew dispatching and timekeeping; and freight car scheduling and conductor work order reporting technologies.

The next generation of railroad electronics applications is likely to carry the computerized data and telecommunications-intensive applications to a higher level of usefulness made possible by advances in digital data RF communications technology. Indeed, many observers forecast that the key limitation in development of railway electronics safety and productivity systems in the coming decade will be the scarcity of RF data communications bandwidth.

Although new telecommunications capabilities and options are highly beneficial, the pace of change has been so rapid as to have created some hesitancy and delay about future directions. For example, it has been particularly difficult for railroads to choose optimal development paths for private wireless mobile services, and to be able to afford the huge investments needed to make these changes possible on an industry-wide basis. In the wake of the FCC's Report and Order in P.R. Docket No. 92-231 relating to narrow-banding and "refarming" of RF channels in the land mobile spectrum used by railroads, massive changes are underway which eventually will result in major improvements in channel efficiency. These changes, however, will affect current analog voice transmissions far more than RF digital data communications. The railroads anticipate that their narrow-banding plan for the Part 90 channels will provide capacity for mobile voice communications into the foreseeable future. This result is due, in large part, to the plan's ability to handle message trunking and the transition from analog to digital technology.

The railroads are also standardizing on a telecommunications protocol applicable to the VHF spectrum at 160 MHz. This protocol will allow digital data transmissions between voice messages or on channels reserved for data in the narrow-banding (re-channelization) plan. For many railroad operating functions, and for lightly used parts of the rail network, digital data communications of this type will suffice – and will take substantial parts of the messaging load off conventional (and much less efficient) voice transmissions. Nevertheless, as described in the next section, the six channel pairs for ATCS/PTC at 900 MHz remain a critical part of the overall industry plan for meeting its safety-related communications needs in the 21st century.

C. Future use of RF-based mobile computerized applications will increasingly be safety-critical in nature.

What is left unaddressed by the pending changes in the railroads' VHF mobile radio system is the industry's exploding need for secure mobile datalinks in the future. Envisioned applications will increasingly have safety-critical aspects, which heighten requirements for (1) non-interference from other RF users, (2) robust transmission of intended signals, and (3) availability of adequate channel capacity to minimize risk of delay for emergency messages or corruption of safety-critical message content. In this regard, the specific purpose of the instant petition is to request approval for streamlining the licensing of one of the main pillars of the railroads' requirements for wireless communications that can support development of safety-critical systems and continued deployment into the initial decades of the new century.

Positive Train Control (PTC)[6] is one of the advanced railway electronics systems that is most dependent on development of computer and communications capabilities -- and most affected by the specific functional features, costs, service availability, and choice of standard protocols in the

6 PTC is defined as any set of communications-based train control technologies designed to protect against train collisions, overspeed accidents, or incursions into locations reserved for roadway workers.

quickly changing marketplace for computer and communications products.[7]

Despite hundreds of millions of dollars in development spending over the past 15 years, implementation of PTC systems outside the Northeast Corridor has been slow (as compared to the early forecasts of ATCS deployment in the late 1980s). This was due to continuing changes in technology, which in turn led to inability to reach consensus on industry-wide system design. In other words, the technology has been a moving target.

A recent report of the Railroad Safety Advisory Committee ("RSAC") to the Federal Railroad Administrator[8] concluded that, even after ten-plus years and millions of dollars of development, and despite the falling costs of many electronics components, PTC systems configured for the general rail system are not currently available "off-the-shelf," although planning and development are underway to produce such systems. As the RSAC report noted, it will be necessary for costs to fall or benefits (including both business and safety benefits) to increase if widespread deployments are to come about as a result of normal market forces. Another possibility mentioned in the RSAC report is that

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[7] An example of a vanguard PTC development is the North American Joint PTC Program (NAJPTC) and its four-year design and demonstration of a high speed passenger and freight PTC system in Illinois. This program will feature development of industry PTC standards as well as deployment of a production PTC system between Springfield and Mazonia, IL (120 miles) by Jan. 1, 2003. A more detailed description of this program is set forth at Section III C of this petition.

[8] Report of the Railroad Safety Advisory Committee ("RSAC") to the Federal Railroad Administration on the Status and Future of Positive Train Control (PTC) Systems, Washington, D.C., August, 1999. Excerpts from the RSAC Report are included as Appendix C attached to this

circumstances favoring PTC investments in a particular, perhaps localized, territory may present themselves in the future.

D. The continued access to the six channel pairs at 900 MHz is critical to the continued development and deployment of PTC.

With an eye to economies of scale and faith in a consensus-building design specification process, the ATCS program anticipated an integrated train control product standardized on use of the six channel pairs at 900 MHz. Development of the data communications network was to be supported, synergistically, with business applications tied to ATCS enabling technologies. One or two railroads started down this migration path; Union Pacific Railroad, for example, began building a very extensive 900 MHz data radio network premised on implementation of a work order system rooted in its older mainframe MIS technology used for freight car scheduling. The migration path to an ATCS safety system, in other words, would trace through development of work order reporting over the "Specification 200" data communications network. Other railroads concentrated building of 900 MHz systems and use of the ATCS channel pairs on replacement (or upgrade) of coded track circuits for wayside signal systems.

Current PTC development continues to be modular with respect to both architecture and migration strategies. Where a decade ago cost-effectiveness was to be achieved by industry collaboration on an integrated product, current strategy focuses on competitive development and marketing of product

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components built to consensus standards for both technology and regulatory implementation. Thus, the industry's (and presumably FRA's) role will be less prescriptive than with ATCS regarding the exact design of the PTC system and its components. At the same time, greater cost-effectiveness will be realized through promulgation of industry standards for interoperability, modularity, and competitively open designs for components, and freedom for agencies and railroads to build systems fitting their existing infrastructures and operating objectives. All of these strategies are intended to make PTC systems more cost-effective and hence more likely to be implemented sooner than later.

E. High speed passenger initiatives on rail freight corridor will give rise to greater RF needs for data communications.

Congressional enactments in the 1990s have encouraged development of improved high speed passenger train services on existing freight railroad lines. A common theme in proposals developed under the encouragement of statutory initiatives is that the FRA, states, Amtrak, and the freight railroads would cooperate in the innovative use of existing railroad resources for the good of the general public.

Among the most promising areas for public-private, passenger-freight rail cooperation is in the use of nationally standardized technologies supporting PTC. Some of the functional requirements of PTC that may be met under consensus national standards are datalink frequencies and message protocols, data elements, location determination, on-board electronics, presentation of